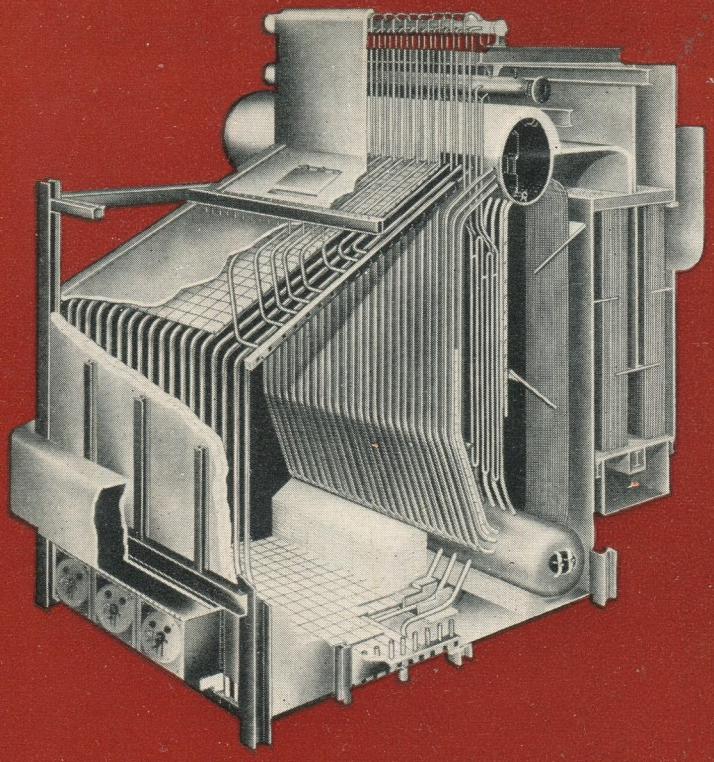
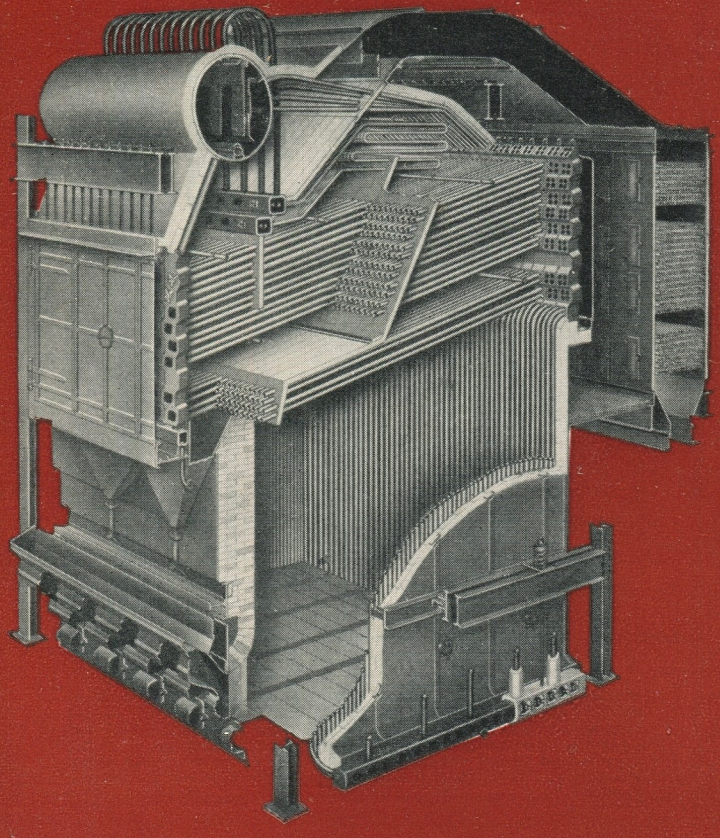
6a
S



A Springfield Bent Tube Unit



A Springfield Straight Tube Unit

Springfield BOILERS

. . . any size
. . . any pressure
. . . any temperature
and for any fuel

SPRINGFIELD BOILER CO.
1965 E. Capitol Ave., Springfield, Ill.

1890 • 1951

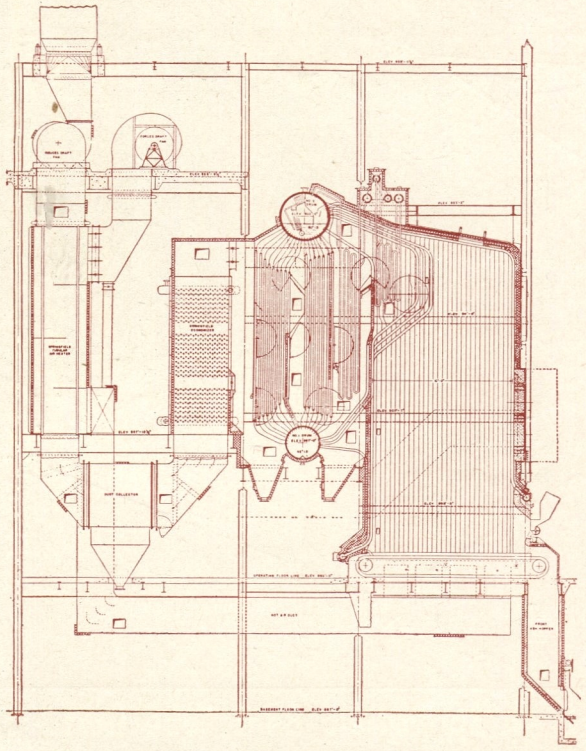
Springfield Leadership in Engineering!

Springfield Boiler Co. founded in 1890 has long been identified with the power plant industry as manufacturers of high pressure boilers, a pioneer in the development of the sectional header boiler and water wall furnace and in recent years of the two-drum bent tube boiler which has attained such prominence.

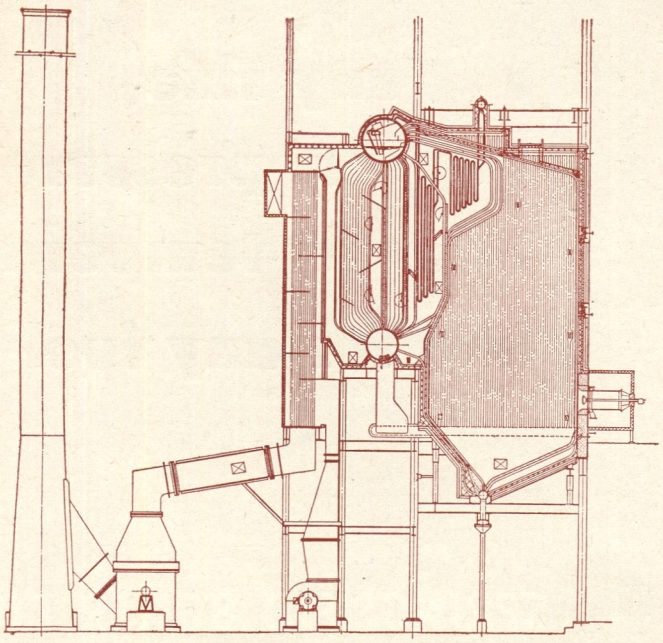
In both straight tube and bent tube boilers the company offers standard designs available over quite a large range of sizes and with furnaces proportioned and arranged for the burning of all types of fuel.

On this page are shown several of our larger modern bent tube boiler installations in which the complete steam generating unit is furnished by this company.

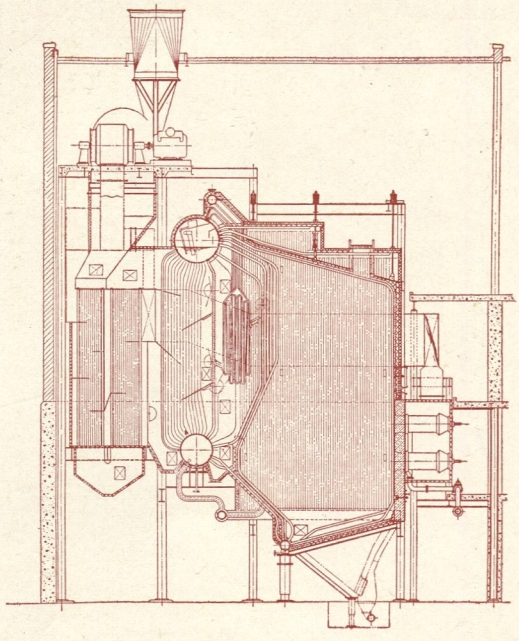
Today, Springfield continues to place highest importance on advanced engineering and finest quality construction that will result in better installations for the user.



NORTHERN RURAL ELECTRIFICATION POWER PLANT — A Springfield bent tube two-drum steam generating unit complete with water cooled furnace, air heater, economizer, forced and induced draft fan equipment, instruments and controls. Designed to operate at 615 lbs. pressure, 830 degrees F total steam temperature at the superheater outlet. Capacity 120,000 lbs. of steam per hour when burning coal on spreader stoker.



SOUTHWESTERN UTILITY PLANT — A Springfield bent tube two-drum steam generator complete with water cooled furnace, superheater, air heater, forced and induced draft equipment. Designed to operate at 630 lbs. pressure, 825 degrees F steam temperature at superheater outlet. Maximum capacity 130,000 lbs. steam per hour when burning gas, oil, lignite or combination of the three.

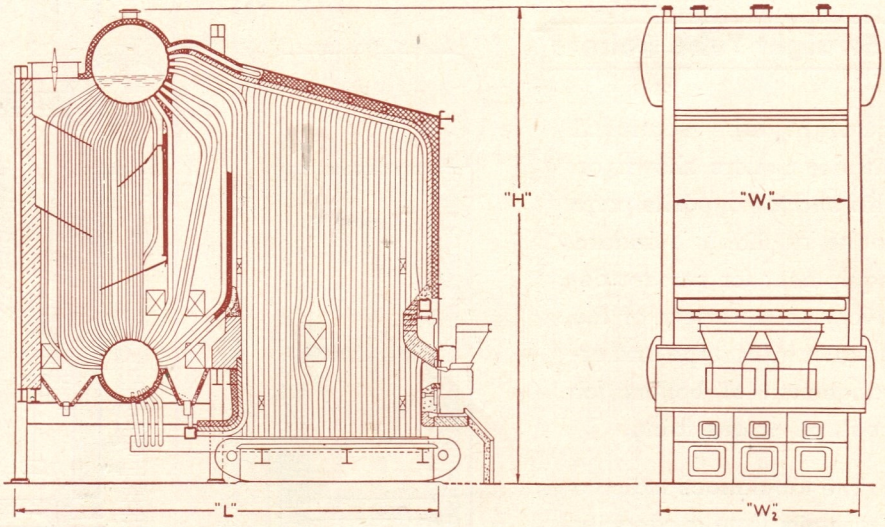


WESTERN MUNICIPAL PLANT — A Springfield bent tube two-drum steam generator complete with water cooled furnace, superheater, air heater, forced and induced draft fan equipment. Designed to operate at 410 lbs. pressure and 750 degrees F at the superheater outlet. Capacity 150,000 lbs. steam per hour when burning gas or oil with future provision for burning pulverized coal.

Two-Drum Boilers

Springfield standard two-drum bent tube boilers are produced in several distinct types. The designs are characterized by the uniformity of the gas flow over the entire width of the boiler bank and provision for water cooled furnace walls proportioned to meet the requirements of the fuel to be used and elimination of ash or soot pockets in boiler passes.

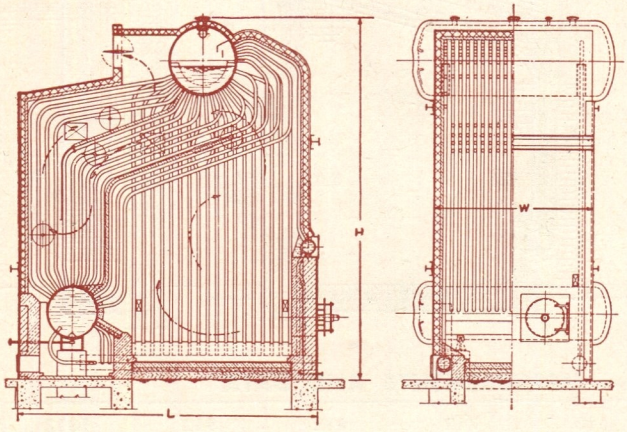
The illustrations and tabulations on this page provide information as to the space required for the standard units offered.



CAPACITY TABLE FOR TWO-DRUM STANDARD — COAL FIRING

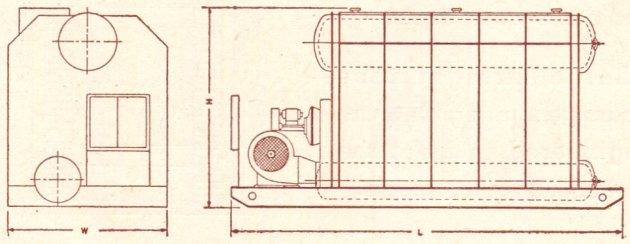
Normal Capacity lbs./hr.	Furnace Width W_1	Space Requirements		
		Length L	Width W_2	Height H
25000	8′0″	22′0″	10′6″	22′0″
30000	9′6″	22′0″	12′0″	24′0″
35000	10′3″	22′0″	12′9″	24′0″
40000	12′0″	23′0″	14′6″	24′0″
45000	13′6″	23′0″	16′0″	26′0″
50000	15′0″	23′0″	17′6″	26′0″

Built to 300, 600, or 900 lb. pressure standards.



TYPE "C" BOILER CAPACITIES AND APPROXIMATE DIMENSIONS

Capacity lbs. per hr.	Overall Height	Overall Width	Overall Length
25000	21′7½″	9′4¼″	18′6″
30000	21′7½″	10′11¼″	18′6″
36000	21′7½″	12′6¼″	18′6″
42000	21′7½″	14′1¼″	18′6″
48000	21′7½″	15′8¼″	18′6″
54000	21′7½″	17′8¼″	18′6″



PACKAGE BOILER STEAM CAPACITIES WITH APPROXIMATE OVERALL DIMENSIONS

Steam Capacity lbs. per hr.	Height to Steam Outlet	Overall Length	Overall Width
7500	9′9″	17′2¾″	8′11⅛″
10000	9′9″	19′2½″	8′11⅛″
15000	10′9″	22′1¾″	8′11⅛″
20000	10′9″	25′10¼″	9′11⅛″
25000	10′9″	29′5¾″	9′11⅛″

Straight Tube Boilers

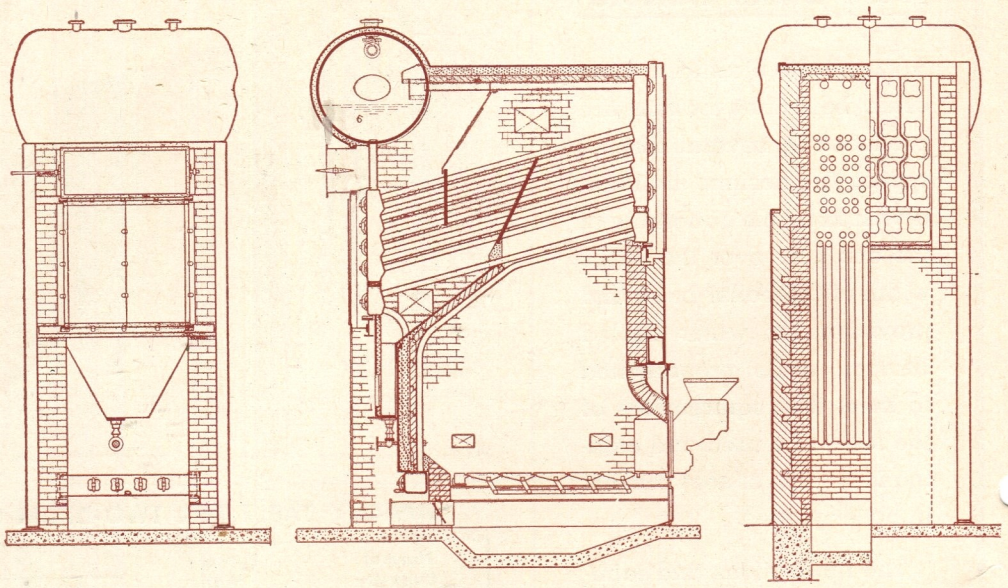
Straight tube sectional header boilers shown on this and the opposite page make available standard equipment for prompt delivery in a variety of the smaller sizes, type and arrangement of boilers for coal, oil or gas firing.

The tabulations indicate that units from a capacity of 7,500 lbs. to 48,000 lbs. per hour are available in these standard designs — when required, water walls can be installed. The rear wall cooling is standard with MC type boiler shown on this page.

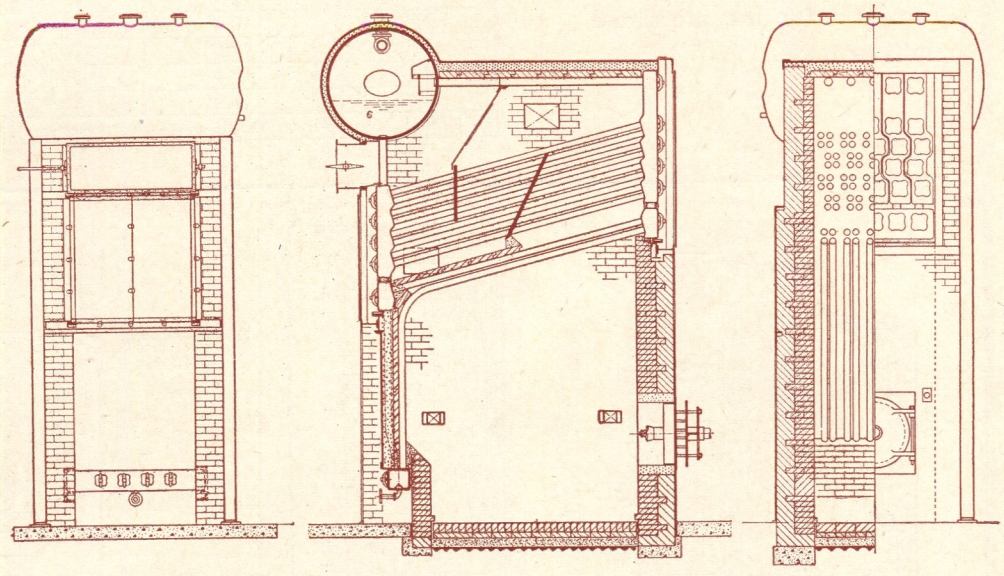
These standard boilers can be furnished to fit over furnaces designed for the burning of bagasse, wood and other waste fuels.

Large straight tube steam generating units are engineered to meet the customer's requirements.

Coal Fired Springfield Type MC Boilers



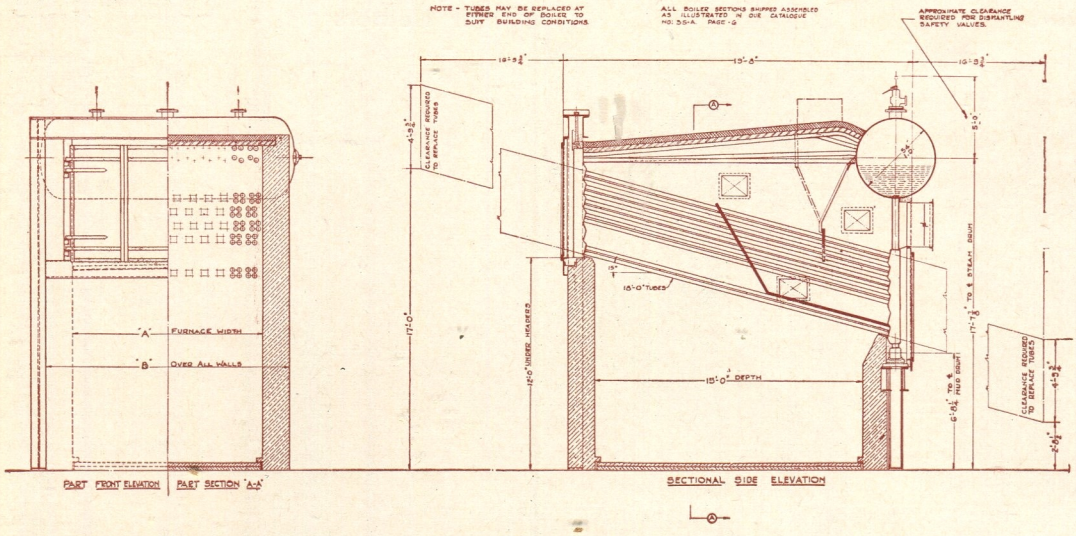
Oil Fired Springfield Type MC Boilers



SPRINGFIELD TYPE MC BOILERS — MEASUREMENTS AND DATA

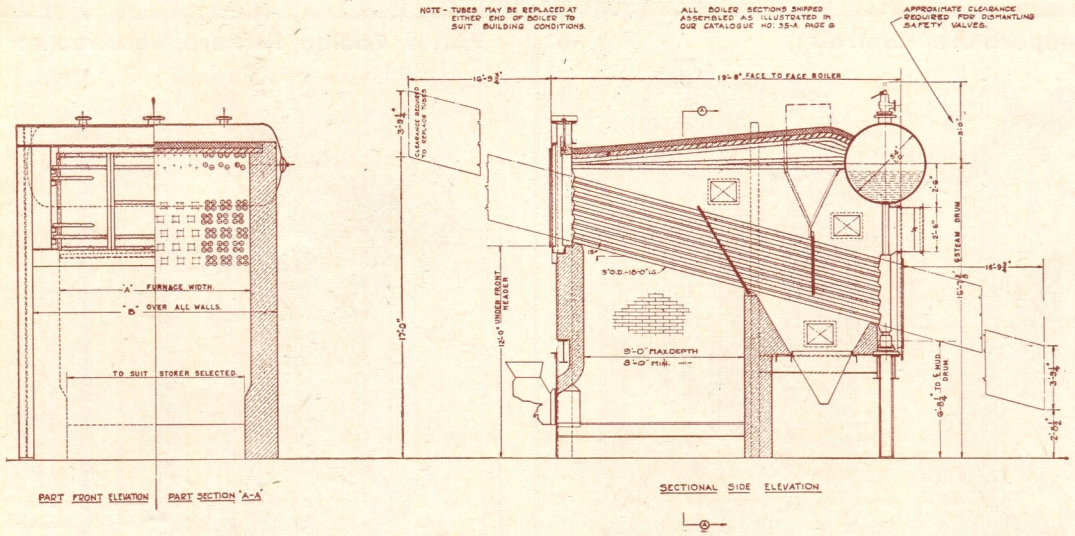
Boiler No.	510	610	710	810	712	812	912	1012
Steam Capacities Lbs. / Hr. Cont.	7500	9000	10500	12000	12500	14300	16000	17800
Heating Surf.	895	1077	1256	1430	1490	1703	1918	2128
Furnace Oil & Gas Vol. Cu. Ft. Stoker	305 270	360 320	415 370	475 424	550 485	625 555	700 620	775 690
Furnace Width	4′7½″	5′6″	6′4½″	7′3″	6′4½″	7′3″	8′1½″	9′0″
Overall Width	8′2½″	9′1″	9′11½″	10′10″	9′11½″	10′10″	11′8½″	12′7″
Overall Length	11′11 3⁄16″	11′11 3⁄16″	11′11 3⁄16″	11′11 3⁄16″	13′10 3⁄16″	13′10 3⁄16″	13′10 3⁄16″	13′10 3⁄16″
Overall Height	19′4″	19′4″	19′4″	19′4″	19′9″	19′9″	19′9″	19′9″
Furnace Depth	7′9 7⁄8″	7′9 7⁄8″	7′9 7⁄8″	7′9 7⁄8″	9′7″	9′7″	9′7″	9′7″
Steam Outlet Size	4″	6″	6″	6″	6″	6″	6″	6″
Feed Inlet Size	1½″	1½″	2″	2″	2″	2″	2″	2″

Straight Tube Boilers for higher capacity and higher pressures


NOTE - TUBES MAY BE REPLACED AT EITHER END OF BOILER TO SUIT BUILDING CONDITIONS.
ALL BOILER SECTIONS SHIPPED ASSEMBLED AS ILLUSTRATED IN OUR CATALOGUE NO. 35-A PAGE 9
APPROXIMATE CLEARANCE REQUIRED FOR DISMANTLING SAFETY VALVES.
"A" FURNACE WIDTH
"B" OVER ALL WALLS
PART FRONT ELEVATION
PART SECTION "A-A"
SECTIONAL SIDE ELEVATION

MEASUREMENTS AND DATA FOR OIL FIRED TYPE

Normal Capacity	12000	14400	16800	19200	21600	24600	26600	28800	31200	33600	36000	38400	41000	43200	45600	48000
Heating Surface	1730	2080	2420	2770	3110	3460	3800	4150	4500	4840	5190	5530	5880	6220	6570	6920
Sections Wide	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Furnace Width "A"	4'7½"	5'6"	6'4½"	7'3"	8'1½"	9'0"	9'10½"	10'9"	11'7½"	12'6"	13'4½"	14'3"	15'1½"	16'0"	16'10½"	17'9"
Furnace Volume in Cu. Ft.	670	798	925	1052	1178	1305	1432	1559	1686	1813	1940	2067	2194	2320	2447	2574
Overall Width "B"	7 7½"	8'6"	9'4½"	10'3"	11'1½"	12'0"	12'10½"	13'9"	14'7½"	15'6"	16'4½"	17'3"	18'1½"	19'0"	19'10½"	20 9"
Steam Outlet Size	6"	6"	6"	6"	6"	6"	6"	8"	8"	8"	8"	8"	8"	8"	10"	10"
Feed Inlet Size	2"	2"	2"	2"	2"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	3"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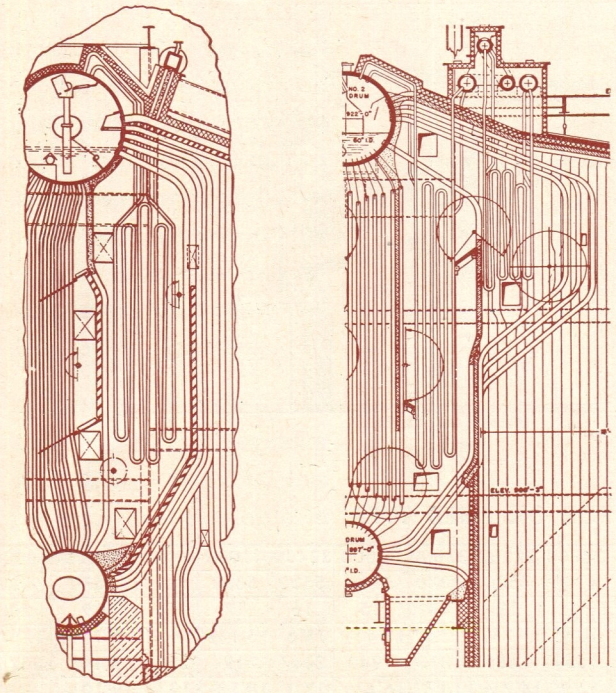
"B" OVER ALL WALLS.
TO SUIT STOKER SELECTED
PART FRONT ELEVATION
PART SECTION "A-A"
SECTIONAL SIDE ELEVATION

MEASUREMENTS AND DATA FOR COAL FIRED TYPE

Normal Capacity	9000	10800	12600	14400	16150	18000	19750	21600	23400	25100	27000	28700	30600	32400	34200	36000
Heating Surface	1730	2080	2420	2770	3110	3460	3800	4150	4500	4840	5190	5530	5880	6220	6570	6920
Sections Wide	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Furnace Width "A"	4'7½"	5'6"	6'4½"	7'3"	8'1½"	9'0"	9'10½"	10'9"	11'7½"	12'6"	13'4½"	14'3"	15'1½"	16'0"	16'10½"	17'9"
Furnace Volume in Cu. Ft.	375	446	516	587	658	729	800	870	942	1013	1084	1155	1225	1296	1372	1438
Overall Width "B"	7'7½"	8'6"	9'4½"	10'3"	11'1½"	12'0"	12'10½"	13'9"	14'7½"	15'6"	16'4½"	17'3"	18'1½"	19'0"	19'10½"	20'9"
Steam Outlet Size	6"	6"	6"	6"	6"	6"	6"	8"	8"	8"	8"	8"	8"	8"	10"	10"
Feed Inlet Size	2"	2"	2"	2"	2"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	2½"	3"

Auxiliary Equipment

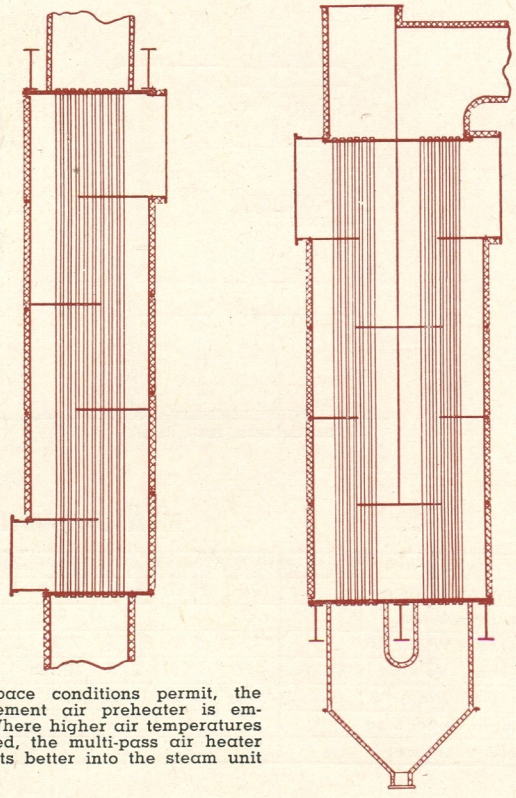
Superheaters



(Left). A superheater for up to 750 deg. F., total temperature.

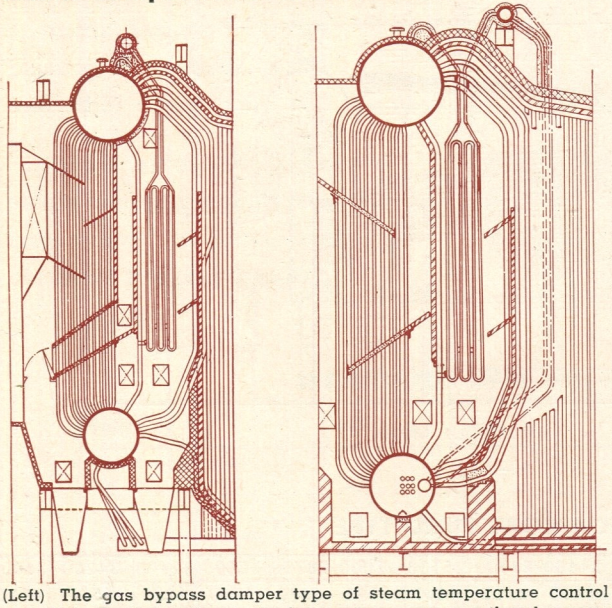
(Right). A superheater for 825 deg. F., or higher temperature and interstage spray type desuperheater to maintain constant temperature from 25% load to full load.

Air Heaters



Where space conditions permit, the single element air preheater is employed. Where higher air temperatures are needed, the multi-pass air heater usually fits better into the steam unit assembly.

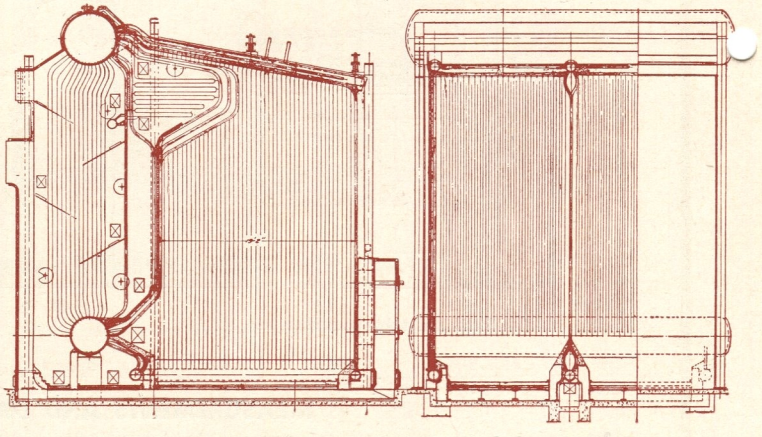
Steam Temperature Controls



(Left) The gas bypass damper type of steam temperature control is widely applied. Due to high gas temperatures, the dampers, bearings and shafts are usually of alloy materials. Either fluid cooled or air cooled mechanisms can be furnished, both for manual and for automatic operation.

(Right) Steam temperature controls of the submerged tube type have their particular application. This type control is also used to obtain steam of two different temperatures simultaneously from one unit.

Water Cooled Furnace Construction

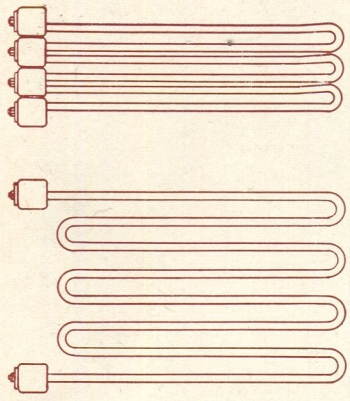


Typical Springfield unit with completely water cooled furnace built for pressures up to 1600 p.s.i.

The above diagram shows the rugged water wall construction with Springfield's patented divided furnace.

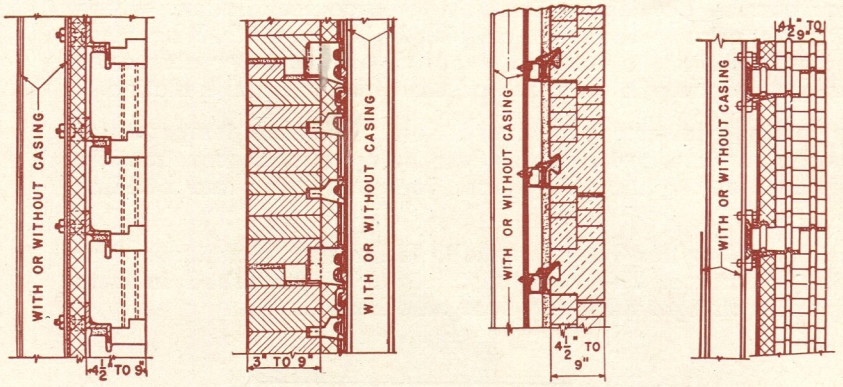
Boiler Settings

Economizers



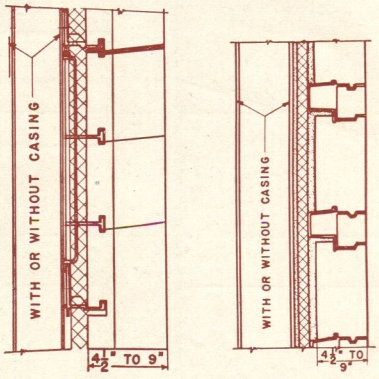
Economizers can be furnished in both the return bend header type, and the continuous loop element type, depending upon the specific conditions.

Suspended and Solid Walls

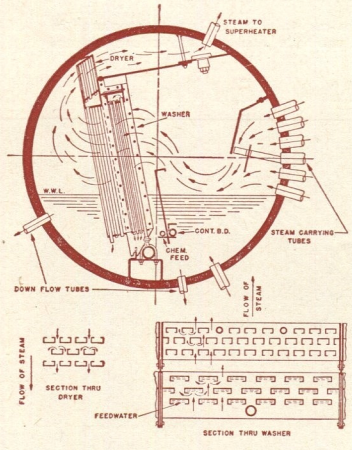


Illustrated are some typical suspended wall designs. These walls can be furnished with or without outside casings, insulated or air cooled, and are supported independent of pressure parts. These wall designs also compensate for refractory expansion.

The economies of solid versus other wall designs require consideration. Solid walls are limited by furnace temperature, height of wall and wall area.

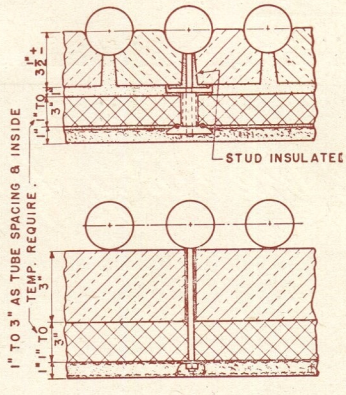


Steam Purifiers



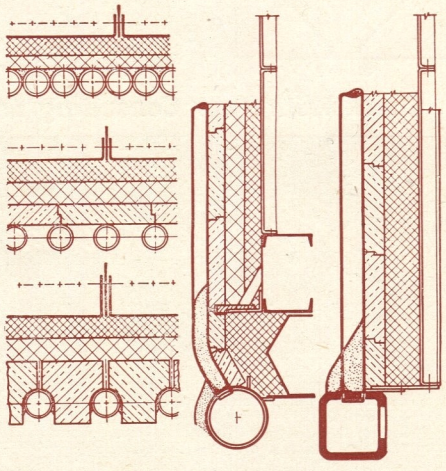
Where high steam purity to the superheater is a requirement, Springfield will furnish their standard steam washer and drier. This steam purifier affords ease of accessibility to all parts and flexibility of operation over a wide load range.

Stud Construction



While many Springfield stud wall designs are available, the above illustrates two typical designs. This type of construction expands and contracts with the pressure parts and offers maximum air tightness with a minimum of expenditure.

Insulated Cased Tile Construction



The above type of enclosure can be furnished in both, the independent steel supported type or the pressure part supported type.

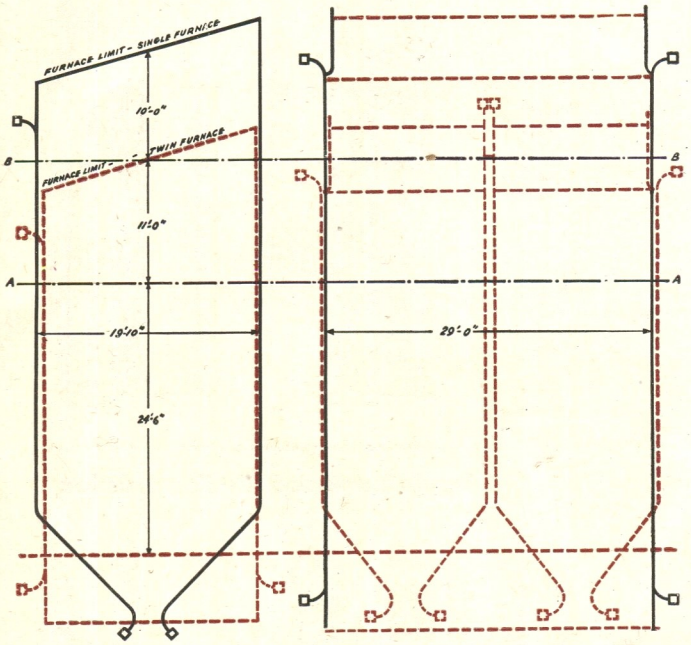
Casing may be of the flanged, bolted type; the batten, bolted type or the welded type. Tube spacing, tile shape, and insulation thicknesses vary to suit temperature conditions.

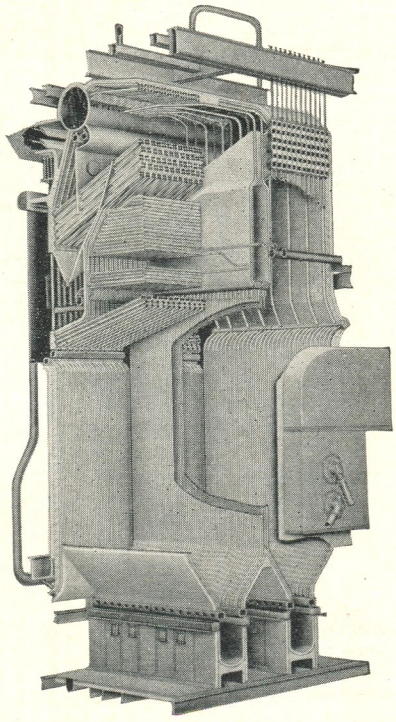
Multiple Furnace — Straight and Bent Tube

Evidence of the advantage of the multiple furnace over the single furnace can be applied particularly to large installations where the single furnace cross-section exceeds 20 feet in width. It becomes exceedingly difficult to maintain even gas temperatures across the single-furnace gas exit area, regardless of burner manipulation.

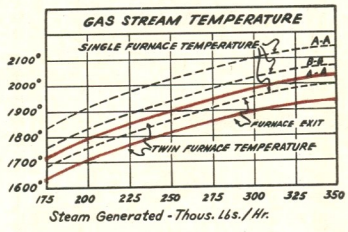
The multiple furnace performs at lower average temperatures across the furnace, yet contains less bulky furnace construction. This feature enters into both steam generator costs and building costs.

Diagram below illustrates the multiple furnace advantages over the single furnace. This construction can be furnished in both Springfield's straight tube and bent tube boilers.





Cutaway view of a typical Springfield multiple furnace.



Temperature curves showing the temperatures in single and multiple furnaces at various stages.

Check With Your Consulting Engineer on Your Modernization and New Plant Projects

Repeat orders tell the story of satisfaction

Following are a few of the Springfield customers who have placed orders for additional units on the basis of superior performance demonstrated by initial installations.

Bellman Brook Bleachery Co., Fairview, N. J.
Brown & Williamson Tobacco Corp., Winston-Salem, N. C.; Louisville, Ky.
Butler Water Co., Butler, Pa.
Caterpillar Tractor Co., Peoria, Ill.
Central Illinois Light Co., Springfield, DeKalb, Peoria.
City Light Plant, Columbia, Mo.
City of Pittsburgh, Home and Hospital, Pittsburgh, Pa.
City of Springfield, Lakeside Plant, Springfield, Ill.
City of Winfield, Winfield, Kansas.
Compania Marx, Mexico (5 locations).
Deere & Co., Moline, East Moline, Ill.; Horicon, Wis.; Ottumwa, Ia.
John Deere Tractor Co., Waterloo, Dubuque, Ia.
Delco Remy Corp., Anderson, Bedford, Ind.
The Hobart Mfg. Co., Troy, Ohio.
F. C. Huyck & Sons, Albany, N. Y.
Illinois State Hospitals, Jacksonville, Peoria, Kankakee, Manteno, Anna.
Illinois State Penitentiaries, Menard, Pontiac, Stateville, Joliet.
International Harvester Co., Chicago, Ill.; Indianapolis, Fort Wayne, Ind.; East Moline, Ill.; Springfield, Ohio.
Iowa Electric Light & Power Co., Boone, Cedar Rapids, Marshalltown, Ia.
Laclede Power & Light Co., St. Louis, Mo.
LaPlant-Choate Mfg. Co., Cedar Rapids, Ia.
Mac-Sim-Bar Paper Co., Otsego, Mich.
The Miami Laundry Co., Battle Creek, Mich.
Michigan Carton Co., Battle Creek, Mich.
Obear Nester Glass Co., East St. Louis, Ill.
Southwestern Gas & Electric Co., Shreveport, La.
Tropical Oil Co. (Standard Oil Co.), Barranca, Bermeja, Colombia, S. A.
U. S. Government (21 locations).

SPRINGFIELD BOILER COMPANY - 1965 E. Capitol Ave., Springfield, Ill.